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WITNESS my hand this
Sixth day of August 2003

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PROVISIONAL SPECIFICATION
FOR A PROVISIONAL PATENT

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Invention Title: CASSETTE FOR SHUTTER ASSEMBLY

The following statement is a description of this invention

CASSETTE FOR SHUTTER ASSEMBLY

The present invention relates to shutter assemblies. A preferred aspect of the invention relates to shutter assemblies installable as modular units.

Typically, the shutter assembly of the present invention includes a plurality of shutter blades, each blade being axially rotatable in unison with each other blade in the assembly. The shutter assembly of the present invention may be mountable in a winged frame such as may be used for a door or a window or may be mounted in a fixed frame such as may be used in a window.

It is an object of the present invention to provide an improvement over prior art shutter assemblies or a useful alternative thereto.

According to one aspect of the invention, there is provided a cassette for a shutter assembly, said cassette including:

a pair of opposed, parallel, spaced elongate members, at least one said elongate member having a plurality of regularly spaced supports;

a translating member adapted to travel reciprocally along or within said at least one of said elongate members;

a plurality of compact bosses adapted to co-act in unison with said translating member to translate the reciprocal motion of said translating member into rotational motion, each said boss located in or on one of said supports; and

a plurality of shutter blades, each said blade engaged with one of said bosses,

wherein the pair of elongate members are adapted to remain substantially co-planar relative to each other during installation of said cassette without the need for top or bottom reinforcing rail members parallel to the blades.

In a particularly preferred embodiment the cassette incorporates a modular kit installable as an operable shutter assembly with a hidden mechanism.

The cassette is preferably in a modular form ready to be installed into a pre-existing wall opening. The cassette may be available in a range of sizes generally corresponding to standard wall opening dimensions which may vary from one jurisdiction to another. Each cassette may be engageable to like cassettes whereby to cover a wall opening larger than an individual cassette. The cassettes may be engageable side by side

whereby the opposed outer wall of adjacent elongate members may be engaged. The elongate members of adjacent cassettes may be engaged one on top of the other.

The outer wall of the elongate member may include any one of a variety of elongate member engagement means whereby to engage an adjacent cassette. For example, an outer wall of the elongate member may include male members adapted to engagedly cooperate with female members on a elongate member of an adjacent cassette. The male members may include headed pins. The male members may include snap lock locaters. The female members may include any one of apertures, grooves, tracks, slots or the like. The elongate member engagement means may include tenon and mortise or tongue and groove combinations and the like.

In accordance with another aspect of the invention, there is provided a method of installing one or more cassettes having a pair of opposed parallel elongate members spaced from each other by a plurality of shutter blades rotatably mounted therebetween. According to this aspect of the invention, the one or more cassettes may be installed in a wall opening, the method including the following steps:

(a) calculating the number of the cassettes required to cover the wall opening;

(b) rabbeting an existing stile in the wall opening sufficient to form a recess adapted to retain the elongate member within the stile such that the elongate member lies flush with the outer surface of the stile; and

(c) locating the elongate member within the stile,

wherein the pair of elongate members are adapted to remain substantially co-planar during installation of each cassette without the need for top or bottom reinforcing rail members parallel to the blades.

In an optional method to that described above, steps (b) and (c) above may be replaced by the following step:

(d) positively fixing at least one of the elongate members to an existing stile in the wall opening whereby the elongate member sits proud of the outer surface of the stile.

Where the elongate member sits proud of the stile, the cassette may be positioned to sit either forward or behind a centre line of the wall opening. The cassette may be incorporated into or be installed proud of an existing stile of an existing fixed glass or operable opening. The cassette may be mounted in a variety of ways depending on

design outcomes, such as orienting the blades so that they will project proud from the front or rear of the frame. Locating the elongate member merely on the outer surface of the vertical frame member of the wall opening may be a useful method whereby to minimise the amount of work required by, for example, an amateur builder unwilling or unable to form a suitable recess in a pre-existing vertical frame member.

It will be appreciated, however, that installing the elongate member in the vertical frame member has the advantage of maximising the ventilation and viewing area afforded by the original wall opening, unlike prior art shutter assemblies where a significant proportion of the available wall opening area is taken up by the vertical housings (accommodating the blade rotation mechanism) and the top and bottom rails extending horizontally therebetween, which rails provide the structural rigidity required for the framed shutter assembly in the prior art.

The elongate member may be made from a variety of suitable materials, including aluminium and polymeric materials. For example, the elongate member may be formed from cast aluminium. Alternatively, the elongate member may be formed from injection moulded plastic. The material used, to a large extent, will be determined by such factors as: required level of security and attendant strength requirements, live load calculations, wind load calculations, anticipated exposure to weather and aesthetic considerations such as colour and surface finish.

The elongate member is preferably of constant cross-section along its entire length. The elongate member may be a solid structure. Preferably, the elongate member defines a track, recess, groove, slot or channel along or within which the translating member travels. Still more preferably, the elongate member is in the form of a housing, the housing may define an internal cavity. The internal cavity may have dimensions which permit linear travel of the translating member in a longitudinal direction within the housing but permits the translation member substantially no lateral play. The housing may be configured to enable the translating member to interact with each boss.

Preferably, the interaction between the translating member and the boss is by direct physical contact. Preferably, the linear movement of the translating member engages with the boss to impart the required rotational motion to the boss. Typically, this may be achieved by a rack and pinion-type arrangement. The translating member may interact with the boss by frictional engagement. Frictional engagement may be achieved by, for example, a belt with a high frictional surface such as may be achieved by a belt made of rubber or other flexible, resilient and/or elastic materials. The translating member may have a roughened or corrugated surface adapted to co-act with a complementary surface

on the boss. The complementary surface on the boss may be cylindrical. The interaction may be effected by a combination of protrusions and recesses located on either or both the translating member and the boss.

Preferably, the translating member is a rigid rod or bar, such as a rack, with protruding teeth adapted to mesh with complementary geared teeth on the complementary surface of the boss.

The translating member may perform the dual function of engaging with and rotating the boss as well as serving to secure the boss in the housing. This may be achieved by the cog of the boss and the rack meshing and the boss being held in position by an inside bearer.

The boss may be a compact structure mounted for rotation in the housing. The boss may be seated for rotation in one of the supports of the housing. The mounting of the boss may be a tight fit whereby there is substantially no play relative to the axis of rotation of the boss. This may be achieved by configuring the support to closely complement a bearing of the boss. The bearing may be substantially cylindrical whereby to rotate within a corresponding cylindrical bore of the support. The bearing may be made of a low-friction and/or self-lubricating material. The boss may include an axial pin extending outwardly from the boss.

The support may include an aperture located in the inner wall of the housing facing the shutter blade. The boss may be stably retained for rotation about a single access by the headed pin extending outwardly from the outer end of the boss. The headed pin may be located in a second aperture adapted to permit substantially no play lateral to the axis of rotation of the boss. Intermediate the headed pin and the gear of the boss may be a bush. The bush may be substantially cylindrical. The bush may be adapted to seal the second aperture to prevent ingress of dirt and grime into the internal cavities of the housing.

The boss may include blade engagement means. The blade engagement means may include any one of a number of suitable means for engaging the end of the shutter blade whereby to impart rotational motion to the blade corresponding to the rotational motion of the boss. The blade engagement means may include a protrusion extending internally from the boss. The protrusion may, alternatively, be located on the end of the shutter blade. The blade engagement means may include two or more protrusions. The protrusion may be keyed to co-act with a correspondingly configured recess. For example, the protrusion may be polygonal in cross-section or may be keyed with lateral projections which co-act with corresponding features in the complementary recess. Preferably, the protrusions include snap lock locaters non-releasably receivable in

corresponding apertures. The blade engagement means may include two protrusions locaters extending internally from the boss and non-releasably insertable in corresponding apertures in the end of the blade. In a preferred embodiment, the protrusions extend internally from the internal face of the bearing or, in the absence of the bearing, the gear. The bearing is preferably of suitable dimensions whereby to provide a seal at the support to prevent the ingress of dirt and grime into the internal cavities of the housing.

The blade engagement means may include an end cap formed integrally with, or fixedly pre-attached to, the boss. The end cap may be adapted to form a shallow sleeve to cover, strengthen and engage with the end of the blade. The end cap may also act as a seal for timber and extruded blades. The end cap may be omitted where timber blades are used for aesthetic reasons and where weather or strength considerations, for example, are not an issue.

The boss preferably includes:

an outwardly extending headed pin in the form of a snap lock locater located along the axis of rotation of the boss,

a bush co-axial to the headed pin and cylindrically shaped,

a toothed gear adapted to engage the translating member and capable of translating the linear motion of the translating member into rotational movement of the boss,

a cylindrically shaped bearing adapted to rest in a circular aperture, and

extending internally from the inner face of the bearing, a pair of protrusions in the form of snap lock locaters adapted to non-releasably engage with corresponding apertures in the end of the shutter blade.

It is considered that the blade engagement means in the form of a pair of protrusions provides a mechanical advantage over that of a single protrusion because the points of engagement are offset from the axis of rotation.

The shutter blade may include a number of configurations familiar to those skilled in the art, provided that at least one of its ends is suitably adapted to engage the boss. The blade may include one or more end attachments to facilitate the engagement between the blade and the boss. The blade may include one or more end caps. The end cap may be in the form of a short sleeve extending part way over the surface of the blade from one end. The end cap may include apertures adapted to include boss engagement means

complementary to the blade engagement means. The end cap may be made of a self-lubricating material whereby to decrease friction between the end cap and the elongate member as the blade is rotated.

The end cap may be formed integrally with or fixedly pre-attached to the boss as previously discussed. The end cap may be adapted to complement a variety of blade profiles. For example, the end cap may be adapted to conform to elliptical, ovaloid, rectangular and other suitable blade profiles.

The end cap may include a moveable wall to allow insertion or removal of the blade in situ. For example, the moveable wall may be hinged. The moveable wall may comprise one section of a sleeve portion of the end cap. The moveable wall may comprise about one quarter of the sleeve portion. The moveable wall may be located in the top section of the sleeve portion. The moveable wall may include attachment means to secure the moveable wall in place once the blade is inserted.

It will be appreciated that the translation mechanism may be included in or on only one of the elongated members and that the opposed elongate member may comprise merely a rod, for example, adapted to support the other end of the blade for rotation. For example, the opposed elongate member may include a single pin located in an aperture whereby the blade is free to rotate about the pin.

The invention may be better understood from the following non-limiting description of one or more preferred embodiments, in which:

Figure 1 is an exploded view of a shutter assembly according to a first embodiment of the invention;

Figure 2 is an exploded view of a side component of the first embodiment;

Figures 3a and 3b are perspective views of a boss according to the first embodiment;

Figure 4 is a top plan view of a housing according to the first embodiment;

Figure 5 is an exploded perspective view of the means by which a boss may be engaged to an end cap of a shutter blade according to the first embodiment;

Figure 6 is a perspective view from a different angle of the engagement means shown in figure 5; and

Figure 7 is an exploded view of a shutter assembly according to a second embodiment of the invention.

In figure 1 there is shown a shutter assembly 1 including a pair of opposed elongate parallel and spaced housings 10, a pair of racks 12, a plurality of bosses 30 and a plurality of shutter blades 50 shown in the closed position. Figure 1 also shows schematically a pair of vertical stiles 70, each stile 70 including a rabbeted recess 72 adapted to receive one of the housings 10.

In figure 2 the recess 72 is more clearly shown to be a rectangular slot adapted to receive the housing 10 so that the housing 10 lies flush with the inner facing surface 74 of the stile 70.

The housing 10 may define an internal cavity (not shown) which communicates with the outside environment at either end of the housing 10 and through a plurality of regularly spaced first apertures 16 and a plurality of second apertures 18 (see figure 7). The cavity may include a rack slot 20 and a larger boss chamber (not shown).

The first apertures 16 act as supports for the bosses 30.

Turning to figures 3a and 3b, the boss 30 includes a compact cylindrical section acting as a bearing 32 adapted to rest in and through the first aperture 16, a gear section 34 having radially arranged teeth 36 which are adapted to engage the complementarily shaped and dimensioned teeth of the rack 12. The boss 30 further comprises a bush 38 and a snap lock locater 40 having a groove 42 in the head 44 thereof to laterally compress to enable its insertion through the second aperture 18. The locater 40 acts as a short spindle and is aligned coaxially relative to the boss 30 as a whole. On the bearing inner face 46 of the bearing 32 are a pair of spaced, offset snap-lock locaters 48 adapted to engage corresponding apertures in an end cap of a shutter blade 50.

In figure 4 the boss 30 is shown mounted for rotation in a housing 70. It will be appreciated that the teeth 36 of the gears 34 positively engage the complementary teeth of the rack 12 whereby upon the vertical living and displacement of the rack 12 the boss 30 rotates clockwise or counter-clockwise as the case may be causing the blade locaters 48 to rotate through an archial path. The inner surface 46 of the bearing 32 is dimensioned to lie flush with the inner surface 74 of the stile 70.

In figure 5 the boss is shown to be aligned with a pair of third apertures 52 in the end cap 54 of a blade 50.

The blade locaters 48 are spaced and adapted to be lockably inserted into the pair of apertures 52 whereby to engage the boss 30 with the end cap 54 as most clearly shown in figure 6.

In figure 7 the stiles 70 may be strengthened by the inclusion of a top rail 74 and a bottom rail 76. The top and bottom rails 74, 76 may include tenons 78 adapted to be fixably received in mortices 80 in a manner common in the art. The top and bottom rails 74, 76 may include bevelled or grooved edges 82 adapted to receive the top and bottom edges of the upper and lower most blades 50 (see figure 8) to provide a securer and weatherproof seal when the shutter blades are in the closed position.

In use, the cassette 1 may be installed in pre-assembled form simply by rabbeting the recess 72 to accommodate the housing 10 and installing the cassette 1 with or without the top and bottom rails 74, 76. Accordingly, this presents a significant advantage over the prior art because the need for the top and bottom rails 74, 76 are dispensed with. The tolerances in the butting and engaging services of the various componentary in the cassette 1 are sufficiently high to resist substantial flexing of the housings 10 outside the general plane of the cassette 1 when the blades 50 are in the closed position.

In a particularly preferred embodiment, the boss 30 and end cap 54 are manufactured as a discrete, complete and/or integrated unit.

Throughout the specification the word "comprise" and its derivatives is intended to have an inclusive rather than an exclusive meaning unless the context requires otherwise.

It will be appreciated by those skilled in the art that many modifications and variations may be made to the embodiments described herein without departing from the spirit or scope of the invention.

Dated this 22nd day of December, 2000

Justin Griffiths

By his Patent Attorneys

Chrysiliou Law

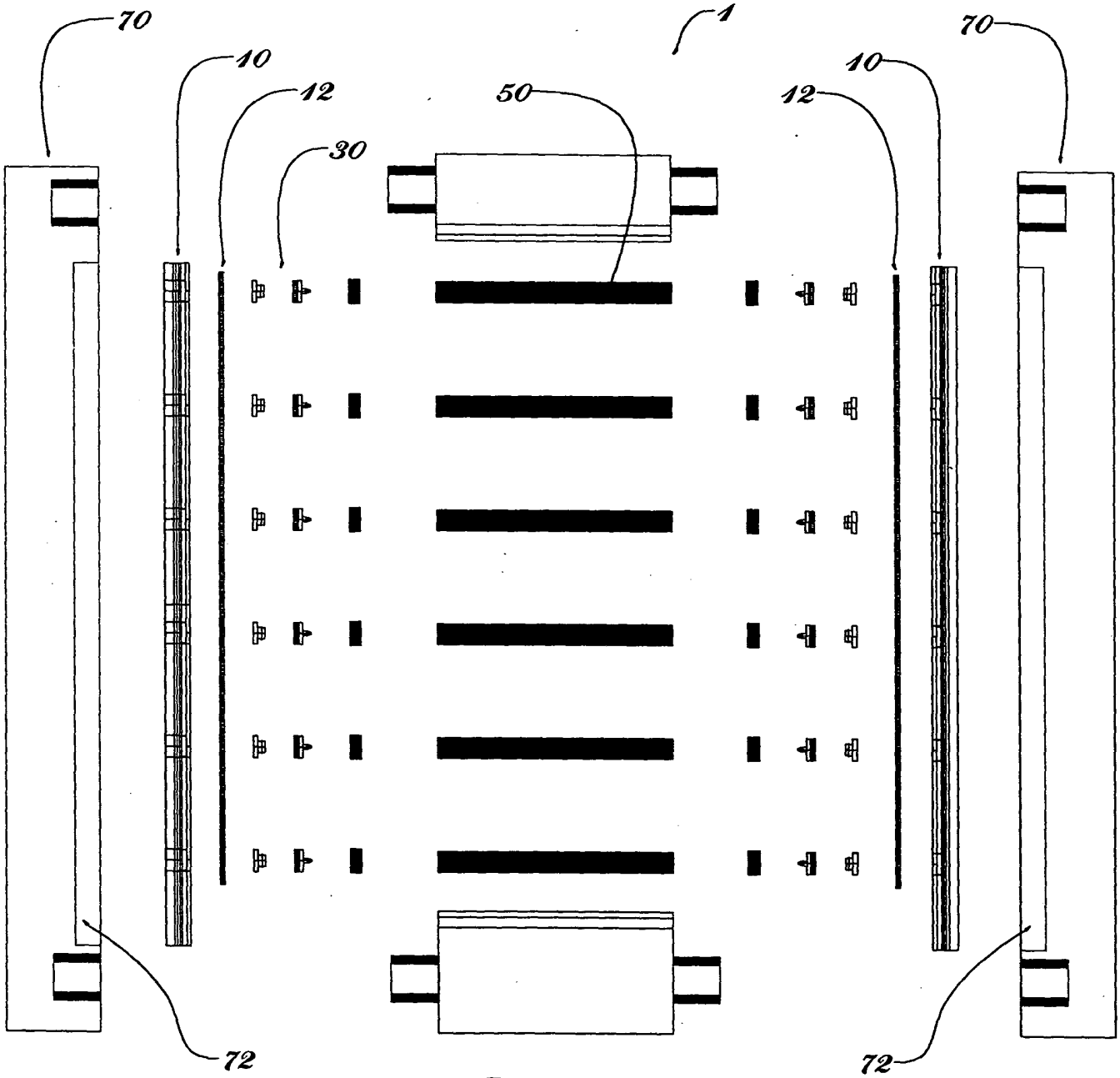
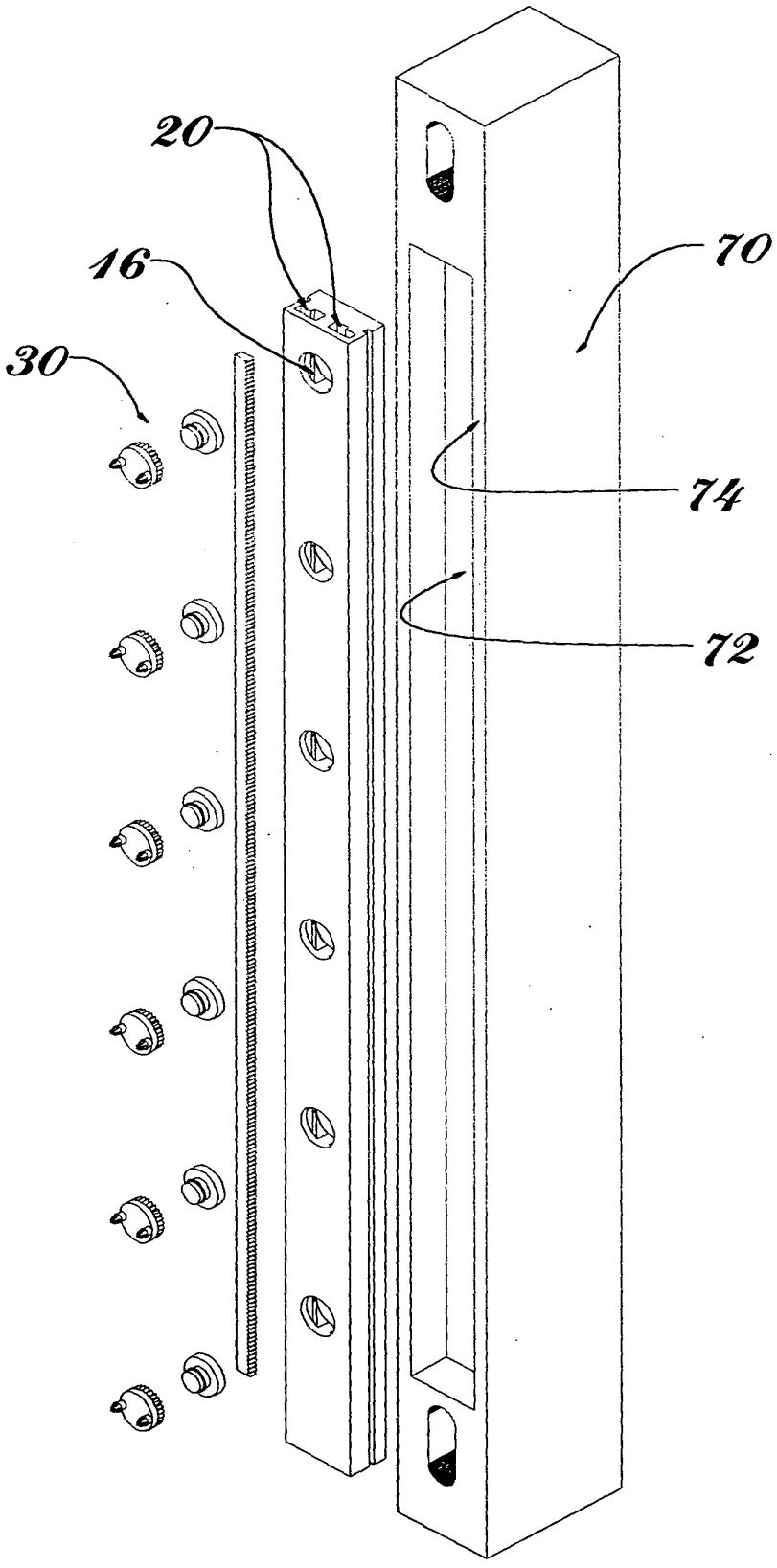


Figure 1

Figure 2



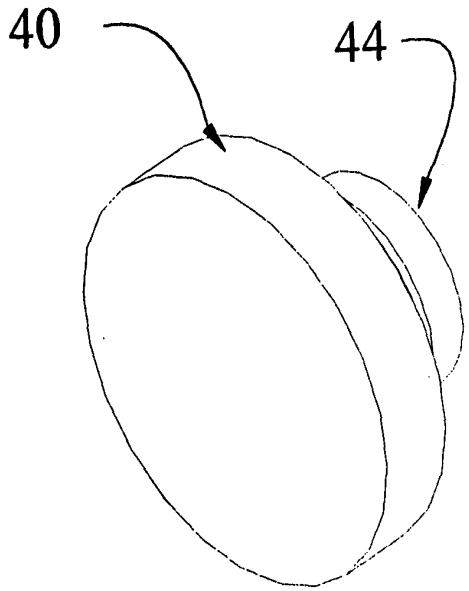
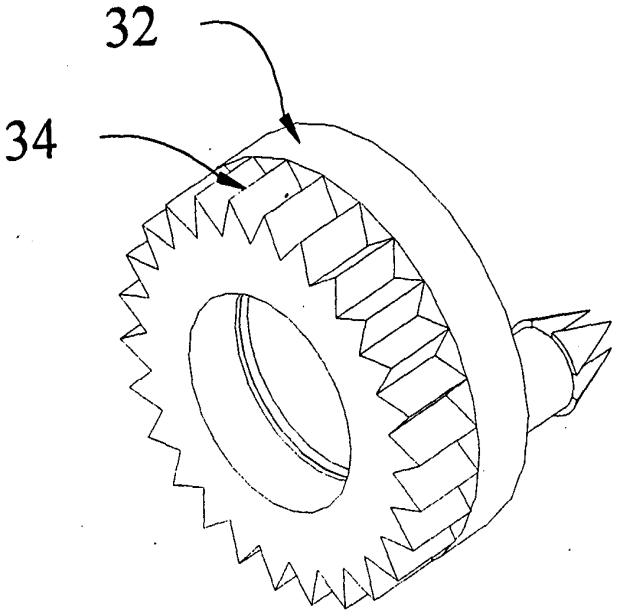


Figure 3a



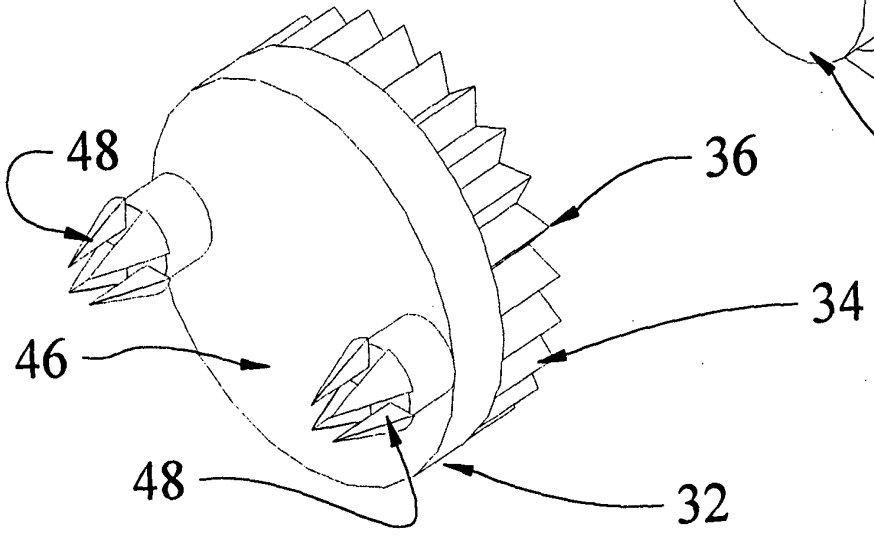
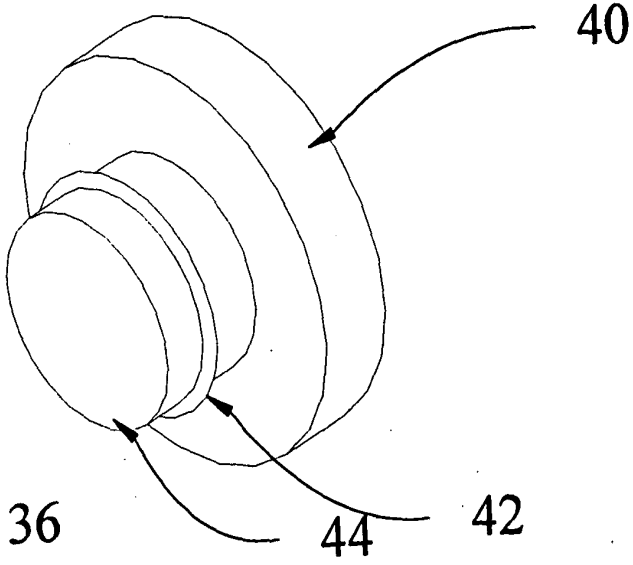


Figure 3b



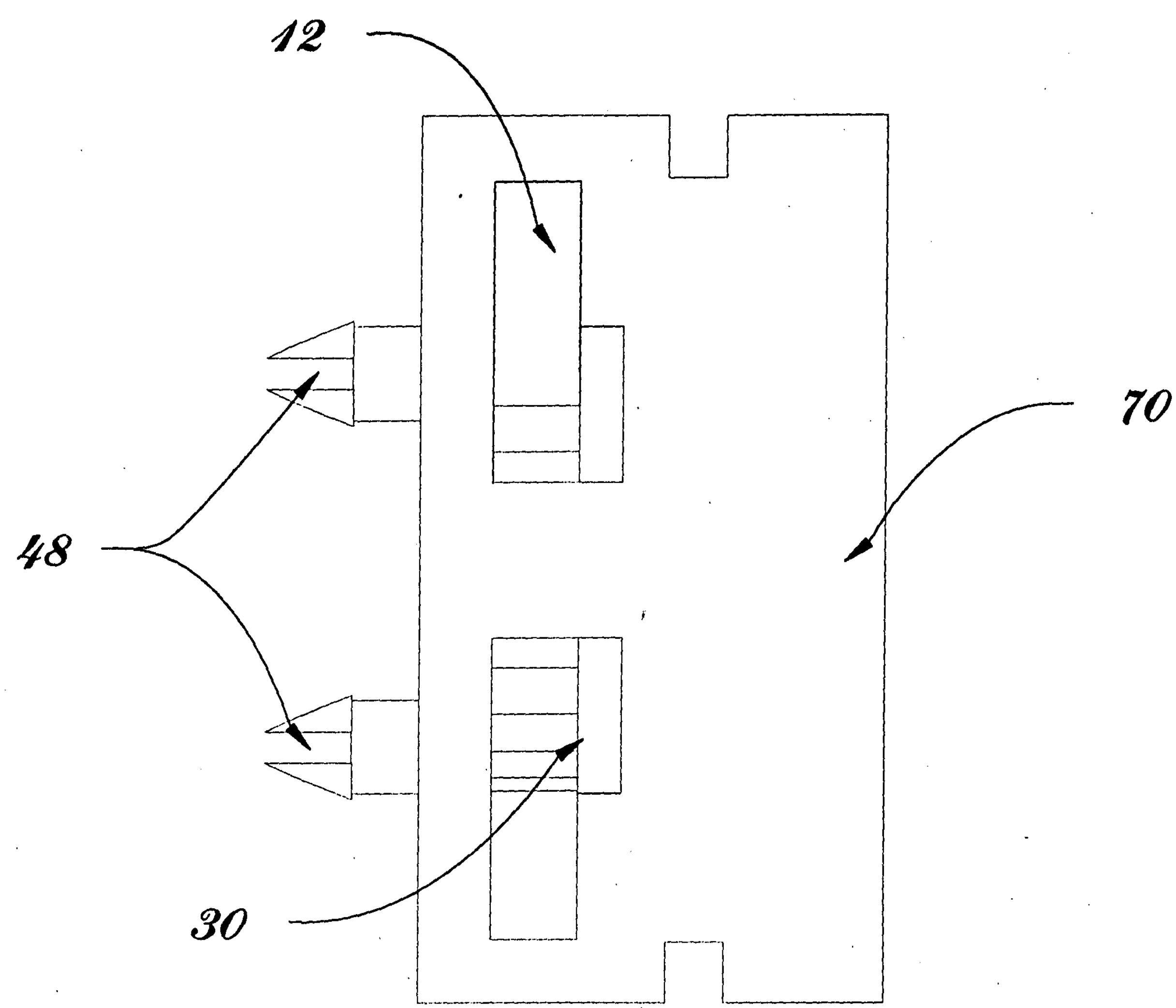
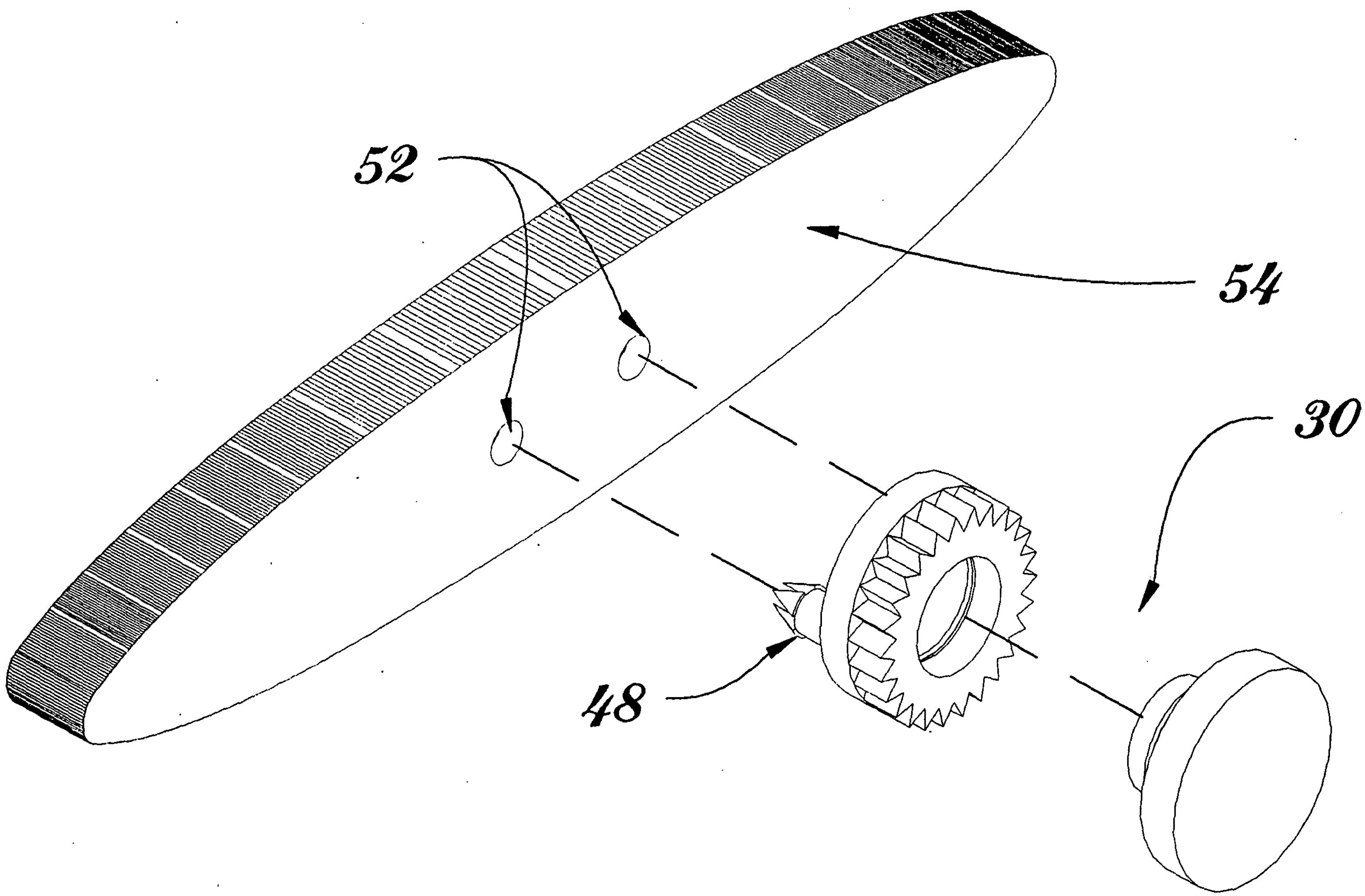


Figure 4

Figure 5



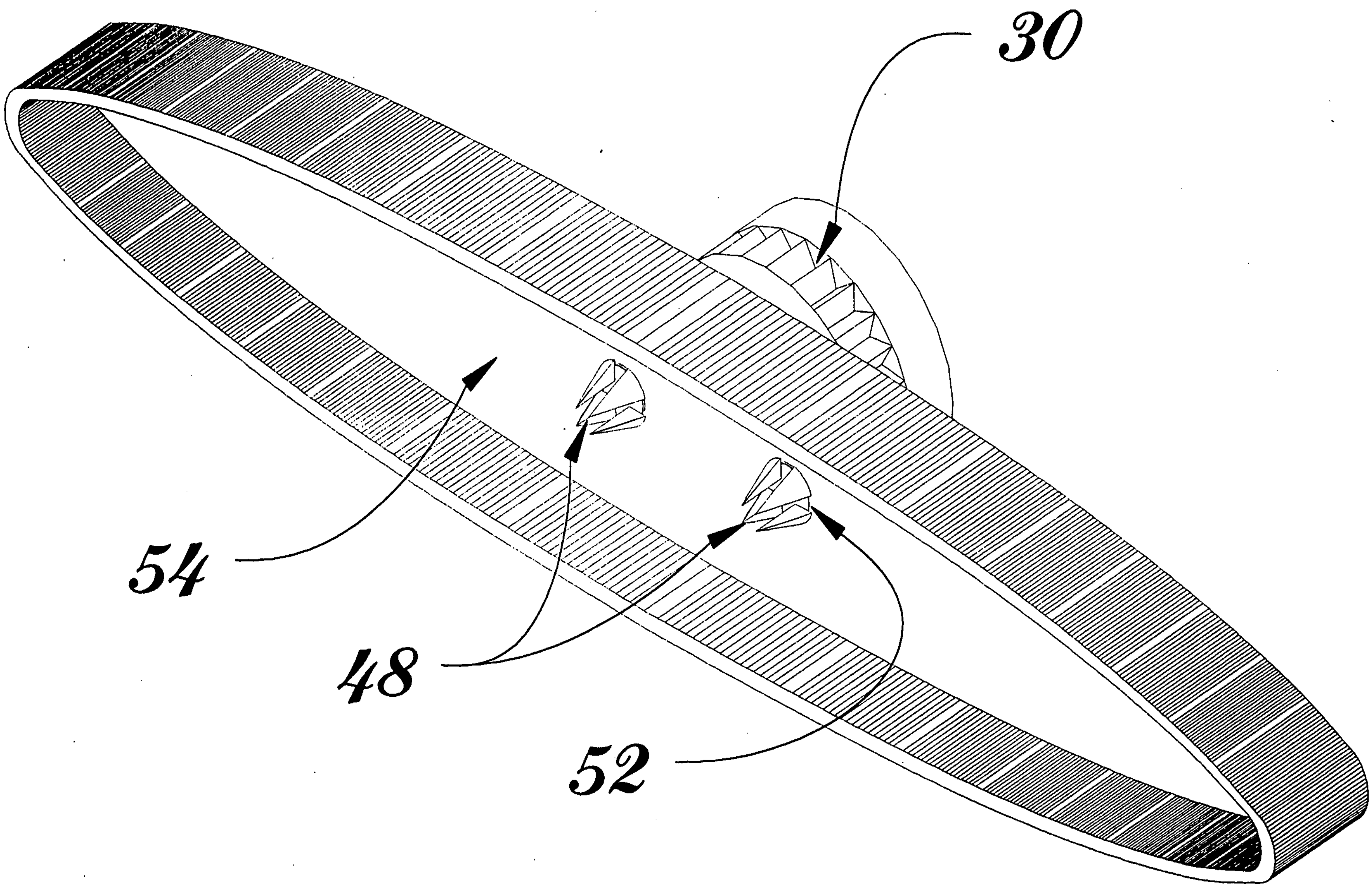


Figure 6

Figure 7